1. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = -15$ and choose the interval that $f^-1(-15)$ belongs to.

$$f(x) = 5x^2 + 4$$

A. $f^{-1}(-15) \in [2.55, 3.24]$

B. $f^{-1}(-15) \in [0.22, 1.57]$

C. $f^{-1}(-15) \in [5.71, 6.76]$

D. $f^{-1}(-15) \in [1.92, 2.48]$

E. The function is not invertible for all Real numbers.

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2. Find the inverse of the function below. Then, evaluate the inverse at $x = 9$ and choose the interval that $f^-1(9)$ belongs to.

$$f(x) = e^{x-5} - 2$$

A. $f^{-1}(9) \in [-0.52, 0.09]$

B. $f^{-1}(9) \in [6.77, 7.99]$

C. $f^{-1}(9) \in [-0.67, -0.3]$

D. $f^{-1}(9) \in [-2.85, -2.48]$

E. $f^{-1}(9) \in [0.5, 1.03]$

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3. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x-2} - 3$$

A. $f^{-1}(8) \in [3.79, 5.33]$

B. $f^{-1}(8) \in [0.3, 0.72]$

C. $f^{-1}(8) \in [-1.81, -1.38]$

D. $f^{-1}(8) \in [-0.85, -0.59]$

E. $f^{-1}(8) \in [-1.27, -1.04]$

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4. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \frac{4}{6x + 29} \text{ and } g(x) = \frac{4}{4x - 17}$$

A. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-8.33, 4.67]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-4.25, -2.25]$

C. The domain is all Real numbers except $x = a$, where $a \in [-9.17, -1.17]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-8.83, -2.83]$ and $b \in [4.25, 8.25]$

E. The domain is all Real numbers.

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5. Determine whether the function below is 1-1.

$$f(x) = -36x^2 - 342x - 756$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is a y-value that goes to 2 different x-values.

C. Yes, the function is 1-1.

D. No, because there is an x-value that goes to 2 different y-values.

E. No, because the range of the function is not $(-\infty, \infty)$.

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6. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = -x^3 + 2x^2 + 2x - 2 \text{ and } g(x) = -4x^3 - 2x^2 + x$$

A. $(f \circ g)(-1) \in [-3, 5]$

B. $(f \circ g)(-1) \in [-3, 5]$

C. $(f \circ g)(-1) \in [-6, -1]$

D. $(f \circ g)(-1) \in [-8, -5]$

E. It is not possible to compose the two functions.

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7. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 14$ and choose the interval that $f^-1(14)$ belongs to.

$$f(x) = 5x^2 + 3$$

A. $f^{-1}(14) \in [5.96, 6.85]$

B. $f^{-1}(14) \in [3.46, 3.64]$

C. $f^{-1}(14) \in [1.66, 2.16]$

D. $f^{-1}(14) \in [1.43, 1.51]$

E. The function is not invertible for all Real numbers.

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8. Choose the interval below that f composed with g at $x = -1$ is in.

$$f(x) = 4x^3 + x^2 - x - 1 \text{ and } g(x) = -x^3 - 1x^2 + x$$

A. $(f \circ g)(-1) \in [21, 24]$

B. $(f \circ g)(-1) \in [-9, 1]$

C. $(f \circ g)(-1) \in [11, 16]$

D. $(f \circ g)(-1) \in [3, 7]$

E. It is not possible to compose the two functions.

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9. Subtract the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-6x - 23} \text{ and } g(x) = 7x^2 + 4x + 8$$

A. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-10, -5]$

B. The domain is all Real numbers except $x = a$, where $a \in [-6.67, -3.67]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-8.83, 4.17]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-0.75, 9.25]$ and $b \in [4.25, 6.25]$

E. The domain is all Real numbers.

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10. Determine whether the function below is 1-1.

$$f(x) = -12x^2 - 57x - 63$$

A. Yes, the function is 1-1.

B. No, because there is an x-value that goes to 2 different y-values.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.
